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ABSTRACT

As part of a 5-year study of 772 students who entered the University of Maryland, College Park, in 1980, a study was conducted of the relationship between John Holland's concept of vocational identity (sureness and confidence in one's vocational plans) and personality type (realistic, investigative, artistic, social, enterprising or conventional) to college satisfaction, retention and academic achievement. Study participants were treated as two groups, a random sample of 468 in the representative group and a black group of 339. Their scores on three instruments (My Vocational Situation, the Self-Directed Search, and the College Student Satisfaction Questionnaire) were analyzed. Results included the following: (1) no differences among the retention rates of the six personality typologies were found in the representative group, but in the black group, significant differences were found between the percentages of non-students in the artistic (39%) and investigative (7%) typologies; (2) in both groups, high levels of vocational identity were found to be associated with high grade point averages; (3) no significant differences were found among the personality types on any of the satisfaction scales for the black group, but in the representative group, social types were significantly more satisfied than investigative types with campus social life and were significantly more satisfied with the quality of their education than both artistic and conventional types; (4) both groups became increasingly confident of their vocational goals over each of the 4 survey years; and (5) no significant correlations in either group were found between grade point average and majors in programs congruent with personality type. Contains 13 references. (KM)

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MLS RESEARCH HIGHLIGHTS

Maryland Longitudinal Study

RESEARCH REPORT #12

CAREER DEVELOPMENT AND ITS ACADEMIC CORRELATES

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EXECUTIVE SUMMARY

In this report an attempt is made to understand issues in higher education such as persistence, retention, and satisfaction, as they relate to John Holland's theory of personality typologies. Briefly, Holland's theory posits that both personalities and environments can be characterized as resembling one or more of six typologies: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. When a person's environment typology is congruent with their personality typology, optimal performance as well as satisfaction should result. Therefore, in terms of higher education outcomes, students who exhibit congruence between the typology characterizing their personality and their educational environment should demonstrate satisfaction with their college career, achieve higher grades, and be more likely to persist until graduation. Based on the theory presented above, five questions were addressed in the present report. These questions are outlined below, along with a summary of the related findings.

Question 1: Are certain personality typologies more likely than other typologies to leave higher education?

No differences among the retention rates of the six Holland typologies were found in the Representative Group. In the Black Group, however, significant differences were found between the percentages of non-students in the Artistic (39%) and Investigative (7%) typologies.

Question 2: Do students who are more sure of their vocational plans earn higher grade point averages?

In both the Representative and Black Groups, high levels of vocational identity (sureness of vocational plans) were found to be associated with high GPAs. Though small in magnitude, these correlations were statistically significant for Year 2 through Year 4 of the study for the Representative Group and in Year 1 through Year 3 for the Black Group.

Question 3: Are certain Holland personality typologies more satisfied than other typologies with their college experience?

In the Representative Group, Social types were significantly more satisfied than Investigative types with campus social life, and were significantly more satisfied with the quality of their education than both Artistic and Conventional types. Finally, Social types rated their overall level of satisfaction with college as significantly higher than did Artistic types. No significant differences among the six Holland types were found on any of the satisfaction scales for the Black Group.

Question 4: Do UMCP students' vocational plans become more clearly defined over time?

Yes, students in both the Representative and Black Groups become increasingly confident of their vocational goals over each of the four years in which they were surveyed.

Question 5: Do UMCP students who major in programs congruent with their personality typologies achieve higher grades?

No significant correlations between GPA and congruence were found in either the Representative or Black Groups for either of the two years in which congruence measures were available.

Maryland Longitudinal Study Steering Committee
Division of Student Affairs
The University of Maryland College Park
Spring 1989

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The Maryland Longitudinal Study (MLS) is a research undertaking of the Division of Student Affairs at The University of Maryland College Park. A significant number of Student Affairs staff have been involved in the study since its inception. A Steering Committee appointed by the Vice President for Student Affairs has been responsible for the methodology, data collection, and management of this project. These individuals are listed in Appendix A of the MLS report entitled "The Maryland Longitudinal Study—A Descriptive Overview: The Study's Purpose, Goals, Features, Participants, and Design."

I. INTRODUCTION

College student satisfaction, academic achievement, and their relationship to persistence in higher education continue to be topics of extreme interest to the higher education community. College student satisfaction has been found to have a significant relationship with persistence in college (Astin, 1975; Tinto, 1975; MLS Research Report #2, 1986). These studies have shown that students who are less satisfied with their college are more likely to leave that college. Academic achievement, typically measured by grade point average (GPA) has also been studied as a predictor of persistence (Tinto, 1975; Astin, 1972). The effects of such variables as high school preparation and parental educational background, as well as sex and race, have been studied extensively in this context. The present report, however, seeks to understand these important phenomena in terms of a broader personality context using John Holland's typology model.

Holland's (1973) theory of vocational choice posits that both personalities and environments can be categorized as one of six types or personality typologies: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (see Table 1 for a description of each type). It further posits that people perform optimally and are most satisfied in environments which are congruent with their personality types. Thus college students, according to Holland's theory, will perform best in a major which is congruent with their personality type, and in general, people tend to do their best work in environments which "match" their personality type. Holland terms the consistency between personality and environment **congruence.**

While the implications of Holland's typologies for one's choice of major and for career counseling are obvious, Holland typologies have not typically been studied in relation to such non-vocational outcomes as satisfaction with college, academic achievement, and retention. Degree of congruence has been related positively to retention (Wiley and Magoon, 1982; Barak and Rabbi, 1981) and to college GPA (Barak and Rabbi). In a 1968 study of 2,347 college students, Holland obtained mixed results for the hypothesis that degrees of congruence would be positively related to satisfaction with college.

The purpose of the current report is to investigate the utility of Holland's theory for understanding the educational outcomes discussed above. In particular, the following five questions will be addressed:

1. Are certain personality typologies more likely than other typologies to leave higher education?
2. Do students who are more sure of their vocational plans earn higher grade point averages?
3. Are certain personality typologies more satisfied than other typologies with their college experience?
4. Do UMCP students' vocational plans become more clearly defined over the college years?
5. Do UMCP students who major in programs congruent with their personality typologies achieve higher grades?

Section II describes the instrumentation used to measure vocational identity and satisfaction with the college experience, and to identify one's Holland code or typology. Section III provides a brief description of the student population surveyed. In Section IV the results of analyses designed to answer the five questions presented above will be presented. These results will be summarized in Section V in which implications as well as suggestions for further research will also be discussed.

II. INSTRUMENTATION

During the five years of the Maryland Longitudinal Study (MLS), several standardized instruments were administered to the student participants. Scores on three of these instruments are used in the present study: My Vocational Situation (MVS), the Self-Directed Search (SDS), and the College Student Satisfaction Questionnaire (CSSQ). These instruments are described briefly below.

My Vocational Situation (Holland, Daiger, and Power, 1980) is a paper and pencil instrument which attempts to assess the extent to which individuals possess a clear and stable picture of their goals, interests, personality, and talents. Estimates of the internal consistency based on samples of high school students, college students, and workers range from .86 to .89. Students are required to respond "true" or "false" to 18 statements such as "I am confused about the whole problem of deciding on a career."

The Self-Directed Search (Holland, 1979) is a self-scoreable, self-interpretable vocational counseling tool which results in a three letter summary code. This code represents the combination of Holland typologies which best characterizes the student. For example, a student with an SDS code of RIC most resembles the Realistic typology, and bears the second and third strongest resemblance to the Investigative and Conventional types, respectively. The students' "highpoint" code is the first letter of the summary code; in this example the highpoint code would be "R."

Holland reports split-half reliabilities of .83 to .95 for the summary scales which comprise the SDS, which is quite high for measures of this type.

The College Student Satisfaction Questionnaire (Starr, Betz, and Menne, 1983) is a 70 item instrument designed to measure the satisfaction of college and university students concerning five dimensions of their college experience. Scores for each of these five dimensions as well as a total score are computed. The five subscales are: Compensation, Social Life, Working Conditions, Recognition, and Quality of Education, with reliabilities ranging from .78 to .87, meaning that these scores provide a highly consistent measure of satisfaction in the five dimensions.

III. PARTICIPANTS

The Maryland Longitudinal Study (MLS) is a five year study of 772 individuals who entered UMCP as first semester freshmen in the Fall of 1980. For a complete description of the study, its purpose, goals, features, participants, and design, please refer to *MLS Research Report #1: A Descriptive Overview.*[1]

The 772 MLS participants are treated as two groups. The Representative Group was obtained through random sampling techniques, and is composed of 468 students. It is important to keep in mind that this Representative Group is not a "white" sample; rather, it reflects the ethnic diversity of the student body at UMCP.

The Black Group is composed of all black students in the entering class of 1980 who agreed to participate in the study (n = 339). For the purposes of analysis, data from black students included in the Representative Group (n = 35) were also included in the Black Group.

As in other MLS research reports, the population discussed in this report is not the entire initial population of participants. For the major part of this report only MLS participants who were enrolled at UMCP in a given year were studied for this report. Therefore, the numbers each year are variable and are affected by missing data.

TABLE 1

Holland Types	Career Themes	Types of Occupations Preferred
Realistic	Rugged, practical, enjoys working outdoors; enjoys working with things more than ideas or people, especially with tools and large machinery	Agriculture, nature, mechanical activities, construction work
Investigative	Likes working with ideas more than with people or things; enjoys solving abstract problems; creative	Design engineers, social scientists, laboratory technicians
Artistic	Artistically inclined and likes to work on activities requiring self-expression; original, creative	Artists, composers, actors, poets
Social	Social and outgoing; concerned about the welfare of others; enjoys being center of groups; prefers to work with people rather than ideas or things	School superintendent, clinical or counseling psychologist
Enterprising	Great talent with words and putting to use in selling, leading, and dominating; enjoys power, status, material wealth	Salespersons, business executives, realtors, politicians
Conventional	Prefers highly structured work settings; enjoys office work and fits well into large organizations	Bank examiners, statisticians, tax experts, computer operators

IV. RESULTS

This section will address the five questions cited in the introduction. All analyses were completed separately for the Representative Group and the Black Group.

Question 1: Are certain personality typologies more likely than other typologies to leave higher education?

MLS participants were categorized as either students or non-students, based on their 1984 registration status. Students were defined as those MLS participants who were still enrolled at UMCP, had transferred to another school or had graduated. The proportions of students and non-students were then compared for each of the six personality typologies, using a chi-square test of significance. Personality typology was defined as students' 1984 SDS high point code. These proportions are presented in Table 2 for the Representative and Black Groups.

In the Representative Group, there were no significant differences among the six Holland personality typologies in the proportions of students and non-students. Although it can be seen from Table 2 that individuals in the Social type were most likely to be students, while those in the Conventional type were more likely to be non-students, these differences are not statistically significant.

In the Black Group, on the other hand, there were significant differences in the proportions of students and non-students among the six typologies. In contrast to the findings for the Representative Group, Artistic types were most likely to be non-students (39%) while Investigative types were most likely to remain students (93%). Enterprising types made up the next highest proportion of those who remained students (90%).

TABLE 2

PROPORTIONS OF STUDENTS AND NON-STUDENTS BY HOLLAND TYPE IN YEAR FOUR FOR REPRESENTATIVE AND BLACK GROUPS

	Representative Group (n = 358)		Black Group (n = 201)	
Holland Type	Student (n = 316)	Non-Student (n = 42)	Student (n = 162)	Non-Student (n = 39)
Realistic	84[a]	16	67	33
Investigative	86	14	93	7
Artistic	90	10	61	39
Social	93	7	83	17
Enterprising	90	10	90	10
Conventional	80	20	80	20

[a]Numbers in body of table represent percentages of a given Holland type.

Question 2: Do UMCP students who are more sure of their vocational plans earn higher grade point averages?

To answer this question, the cumulative GPA for each year was correlated with the vocational identity (VI) score from the instrument *My Vocational Situation* (MVS) for each of the four years of the study. In both the Representative and Black Groups, statistically significant positive correlations were found. These correlations, although small in magnitude, were notable in terms of their patterns.

For example, in the Representative Group the correlations between cumulative GPA and MVS score within each year (i.e., MVS 1981 with cumulative GPA in spring of 1981) showed small but steady increases over each of the four years. Three of these four correlations were statistically significant: those from Year 2 (.11), 3 (.11), and 4 (.13). Although these correlations are relatively small in magnitude, and explain very little of the variance in GPA, it is important to keep in mind that GPA is a very complex phenomenon, and that researchers in this area do not generally expect high correlations. Given this caveat, it is interesting to examine other patterns of correlations between MVS scores and GPA which were statistically significant. In the Representative Group, the correlations of MVS scores from Year 2 and Year 4 of the study with cumulative GPA in each of the four years were significant, as was the correlation of MVS in Year 3 with GPA in Year 4, suggesting that confidence in one's vocational identity plays a part in achieving a high GPA.[2]

In the Black Group, the correlations of MVS score with cumulative GPA for the corresponding year were significant and in a positive direction for every year but Year 4. In addition, high MVS scores in Years 1 and 2 were associated with high cumulative GPA's not only in the corresponding year, but in every year thereafter. It is also interesting to note that all correlations were stronger for the Black than for the Representative Group, although this may be an artifact of the greater ranges of both GPA and MVS scores in this group. Again these results suggest a positive correlation between vocational identity and grade point average.

Question 3: Are certain personality typologies more satisfied than others with their college experience?

Satisfaction scores of students from each of the six Holland personality typologies were compared to answer this question. Holland typology was obtained from the Self-Directed Search (SDS), administered in Year 1, and was defined as the Holland high point code. Satisfaction was measured in Year 3 by the *College Student Satisfaction Questionnaire* (CSSQ) described above. The CSSQ consists of five subscales, each of which yields a separate score. A total score is also computed.

Comparisons among means were made using a one-way analysis of variance, followed by pair-wise post hoc comparisons using the James and Howell (1976) procedure. This post hoc procedure is appropriate for use when group sizes and standard deviations differ substantially.

The first subscale, Compensation, relates to academic rigor or the amount of effort a student feels must be put forth to receive the desired grade. There were no significant differences on this subscale among the six Holland typologies, based on first year SDS code, in either the Representative or Black Groups.

The Social Life scale was designed to measure satisfaction with various aspects of campus social life including opportunities to make friends, date, and engage in social activities. In the Representative Group, significant differences were found between the mean scores of the Investigative and Social types on the Social Life scale. Social types were most satisfied in this area, with a mean score of 49.5, while Investigative types were significantly less satisfied (44.2). No significant differences occurred in the Black Group on this scale.

The Working Conditions subscale relates to such factors as the availability of space in which to study or lounge and the cleanliness and comfort of campus living conditions. The Recognition subscale was designed to measure satisfaction with the support and encouragement provided by faculty and staff members as well as satisfaction with advising and opportunities to interact with faculty members. There were no significant differences in the Representative Group or the Black Group on the Working Conditions or Recognition scales.

The final subscale, Quality of Education, relates to those conditions which affect students' intellectual and vocational growth. There were significant differences among the six Holland typologies in the Representative Group on this scale. Social types were significantly more satisfied with this aspect of campus life than were either Conventional or Artistic types. There were no significant differences in the Black Group on this scale.

In terms of the total CSSQ scores, Social types were significantly more satisfied overall than were Artistic types in the Representative Group, with means of 232.3 and 213.1, respectively.[3]

Question 4: Do UMCP students' vocational identities become more clearly defined over time?

To answer this question, a repeated measures analysis of variance procedure was used. Essentially, this procedure computes the changes in students' MVS scores from year to year to see whether these scores increase (or decrease) significantly over the four year period. The results of this analysis show that, in both the Black and Representative Groups, these scores did increase significantly each year.

In addition, it was of interest to determine whether males and females changed at the same rate, or whether one sex exhibited significantly greater increases than the other. In the Representative Group, there were significant differences in the rate of change from Year 1 to Year 2, and from Year 2 to Year 3. During the former time period, MVS scores of females increased substantially, from 9.0 to 10.8, while those of male students remained relatively static (10.4 to 10.3). In contrast, males showed an increase of two points from Year 2 to Year 3, while females exhibited a more modest gain of .9 point. From Year 3 to Year 4, the increases shown by the two sexes, although significant, did not differ substantially, and by Year 4 males and females had attained very similar MVS scores of 12.7 and 12.8, respectively. Males and females in the Black Group did not exhibit any differential rates of change. MVS means for each year, by sex, are shown in Table 3 for the Representative and Black Groups.

TABLE 3

MVS MEAN SCORES FOR MALES AND FEMALES BY YEAR FOR THE REPRESENTATIVE AND BLACK GROUPS

	1981	1982	1983	1984
Sex	**Representative Group (n = 218)**			
Male (n = 103)	10.4	10.3	12.3	12.7
Female (n = 115)	9.0	10.8	11.7	12.8
	Black Group (n = 87)			
Male (n = 35)	10.2	11.9	12.5	13.3
Female (n = 52)	11.0	11.6	12.9	12.9

Question 5: Do UMCP students who major in programs congruent with their personality typologies achieve higher grades?

To answer this question, a measure of congruence was computed for each student using Iachan's (1984) index. This index compares the three letter Holland code of each student to the Holland code of their major. The congruence score is based on the similarity of the first, second and third letters of these two codes, and yields a range from 1 to 28, where 1 means no congruence and 28 means total congruence. This congruence measure was computed in both the first and fourth years of the study. Congruence measures for the two years were correlated with cumulative GPA in Years 1 through 4.

In the Representative Group, congruence neither in Year 1 nor in Year 4 was significantly correlated with cumulative GPA in any of the four years. Although the majority of the correlations were in a positive direction, indicating that high levels of congruence were associated with high GPA's, the correlation of congruence in Year 1 with GPA in Year 1 was negative. Again, none of these correlations were significant in the Representative Group.

In the Black Group, these correlations were somewhat higher, and all were in a positive direction. The correlations of the first year Iachan index with both second (.18) and third year (.16) cumulative GPA were significant at the .05 level.

In addition to the questions originally stated, it was of interest to see whether the Iachan congruence scores were positively correlated with the CSSQ scores discussed in Question 3. The question here is whether students who major in programs congruent with their personality typologies are more satisfied with various aspects of college life. To answer this question, the first year Iachan congruence index was correlated with each of the five CSSQ subscales and with the CSSQ total scale. As the CSSQ was administered in Year 3, the fourth year Iachan congruence scores were not used in this analysis, since Holland's theory states that congruence should impact on satisfaction, and not vice versa.

For students in the Representative Group, the congruence index was positively correlated with all five CSSQ subscales and with the total scale. Although all six correlations were quite low, it was interesting to note that the two highest correlations were with the subscales that related most to academics: Compensation (.14) and Quality of Education (.12). The correlation of the first year Iachan index with the Compensation subscale, which measures satisfaction with the amount of effort that must be put forth to achieve a desired grade, was statistically significant, and in a positive direction.

In the Black Group, none of the correlations of first year congruence scores with the CSSQ scales were significant, although most were in a positive direction. Two correlations were negative, although so low that they are not meaningful. The small sample size on which the correlations for the Black Group were based may have been a factor in the lack of significance of these correlations.

V. SUMMARY AND IMPLICATIONS

This section summarizes the findings with regard to the five questions originally posed, and discusses possible implications.

Question 1

This question was concerned with whether or not certain personality typologies are more likely than others to leave higher education. While there were no significant differences in proportions of students and non-students for each Holland typology in the Representative Group, significant differences were found in the Black Group. Black Artistic types were most likely to become non-students (39%), while black Investigative types were more likely to remain students (93%).

Several reasons for these differences in the Black Group can be suggested. One possibility is that Artistic types in this group may have elected to take more artistic and fewer academic courses in high school, and thus are less well prepared than their Investigative counterparts. Another reason which might plausibly be suggested is that Artistic students may be less satisfied with their college experience than other personality types, and may leave school because of this dissatisfaction. Although the analyses conducted to answer Question 3 revealed no significant differences among the six personality types within the Black Group, significant differences involving the Artistic type were noted in the Representative Group. It may be that the smaller sample size of the Black Group was insufficient to allow detection of these differences in that group. In fact, an inspection of the CSSQ means does reveal the Artistic Group to have lower averages on several of the satisfaction scales. One reason for the lower satisfaction levels among black Artistic types may be that predominantly white schools, in general, tend to have a Eurocentric bias in the type of culture which is supported, and to offer little support for Black arts. Whereas black Investigative types may find ready outlets for their interests in the predominantly white college environment, this may not be the case for black artists. **Perhaps more of an effort needs to be made to foster an appreciation of cultural diversity in artistic fields, especially on predominantly white college campuses.**

Question 2

This question was concerned with the relationship between vocational identity and grade point average. The hypothesis here was that students who are more sure of what they want to do vocationally would be more motivated to perform well in school. In both the Representative and Black Groups, high GPA's were found to be associated with high levels of vocational identity, as measured by the MVS. These correlations were statistically significant in Years 2 through 4 in the Representative Group, and in Years 1 through 3 in the Black Group. In addition, these correlations showed a small but consistent increase over the four years for the Representative Group.

Several of the correlations of GPA in a given year with the MVS scores from both later and earlier years were significant in both the Representative and Black Groups. While Holland and others have theorized that high MVS scores should be associated with high GPA's during the same year and in subsequent years, Holland's theory does not address the reciprocal effect of GPA on vocational identity. The patterns of correlations found in this study seem to indicate this type of reciprocity, however. In other words, high GPA may be influencing high scores on the vocational identity measure. More research needs to be done to discover whether vocational identity and GPA affect each other in a circular pattern, and whether these effects tend to be simultaneous or delayed.

Even though significant correlations existed between GPA and MVS scores in both groups, the amount of variance actually explained by this relationship was quite small (less than seven percent in all cases). Given this, it was of interest to conduct several additional analyses in an attempt to identify other factors associated with vocational identity. Although few of these analyses resulted in significance, some interesting trends were revealed.

In both the Representative and Black Groups, students with high levels of vocational identity tended to be influenced most in their career choice by faculty members and by academic and non-academic clubs during Year 1. This trend was also seen in Year 2 for the Representative Group and in Year 3 for the Black Group. In both Groups, students with high MVS scores were also more likely to say that a teacher had been influential in terms of their career choice. This result was seen in Years 1, 2, and 3, for males and females in both groups. In the Black Group, students who reported that their career choice had been extremely influenced by any source—father, mother, friend, teacher, or advisor—tended to have high levels of vocational identity in Years 1 and 2.

Although these trends are interesting, more research must be done to identify those factors which affect vocational identity. **The results reported here seem to suggest that faculty members can have a positive influence on vocational identity and career choice, and that higher levels of vocational identity may in turn result in higher grades.**

Question 3

This question concerns an issue which has been alluded to in the discussion of Question 1: whether students with certain personality typologies are more satisfied with their college experiences than others. It was noted in Question 1 that, although there were significant differences among Holland typologies in the Representative Group, this was not true for the Black Group. One reason for this may be the extremely small size of the Holland groupings for black students, since an inspection of their satisfaction scores reveals several of the differences by typology are as large or larger than those for the Representative Group. Given these results, one obvious suggestion for further research would be to replicate this analysis with a larger sample of black students.

In the Representative Group, Social types were more satisfied than Investigative types in terms of campus social life, and were more significantly satisfied than both Artistic and Conventional types in terms of quality of education. Finally, Social types were significantly more satisfied than Artistic types in terms of overall satisfaction.

That Social types were significantly more satisfied with campus social life than Investigative types is not surprising, given the personality attributes which are generally thought to characterize these Holland typologies. Social types are described as outgoing and people-oriented, whereas Investigative types tend to prefer working with ideas rather than people. However, this result does suggest the need for providing more campus social activities which would appeal to types of students other than Social.

The finding that Social types are significantly more satisfied than both Artistic and Conventional types with the quality of education on campus is somewhat less intuitive. It may be that Social types, being more interested in social life than in academics, are more easily satisfied with the quality of education. It is also very likely that students in these three Holland types (Social, Artistic, Conventional) major in different fields. As a unit, they may be exposed to different teaching methods and environments, which may differently impact their vocational or personal growth. Further research in this area should focus on differences perceived in the quality of education for different major fields. It may be that it is more difficult to foster intellectual and vocational development in some academic areas than in others. **If this is the case, more attention might be given to the creation of teaching methods which encourage development of the student as well as transmission of the course's content.**

Question 4

This question focused on whether students' vocational identities became more clearly defined over time. Additionally, it was of interest to determine whether male and female students within each group developed at the same rate over the four year period (1981-1984).

The first question can be answered very simply: yes, the vocational identities of students in both the Black and Representative Groups do become more clearly defined over the four years, meaning that students become more confident in their choice of a career, and report fewer problems in making career decisions. The question concerning male/female differences in the amounts of change students showed each year is slightly more involved. In the Representative Group, females showed a significantly greater increase from Year 1 to Year 2 than did males, whose score remained relatively static during that time period. From Year 2 to Year 3, however, male students developed at a much higher rate than did females. From Year 3 to Year 4, the scores of male and female students increased at much the same rate, and by Year 4 the two sexes had attained similar scores.

Although there were no significant differences in the rates of change for male and female students in the Black Group, this may be the result of the small sample size. An inspection of Table 3 reveals some interesting trends. In particular, female students appear to have a substantial increase in vocational identity between Years 2 and 3, which then levels off between Years 3 and 4. Black male students, on the other hand, show their largest increase between Years 1 and 2, but continue to increase their scores substantially each succeeding year. These differential patterns of growth may be related to differences in vocational planning during the high school years.

The sex differences may have implications for those involved in career counseling and academic advising. It may be that males and females would obtain the most benefit from these services during periods of substantial growth. If so, it is important to realize that these periods may not be the same for both sexes, or over different racial groups. On the other hand, practitioners in these areas may feel that students need their services most when they are least likely to show any improvement on their own. The obvious question in either case is: what is causing these differential periods of growth? **Further study should be made of the factors influencing vocational identity in order to better assist students in this area during their entire college career.**

Question 5

This question was concerned with whether students who major in programs congruent with their personality typologies achieve higher grades. Results of the analyses for this question were somewhat disappointing in that there appears to be little correlation between congruence and GPA. Intuitively, it would seem that students who are majoring in programs to which they are more suited would be more likely to earn higher grades. However, it must be kept in mind that students do not take all of their coursework within their major field. In addition, grading methods as well as course difficulty may differ substantially across subject areas, which would of course affect students' GPAs. Finally, such factors as motivation, previous preparation, and aptitude, among many others, also affect GPA. Given the above, it is not surprising to find that congruence was not substantially related to GPA, especially when analysis was done over all majors. **A more sensitive analysis may be to study this relationship within majors or departments, so that the possible effects of differential grading and difficulty levels are minimized.**

END NOTES

1. For a copy of Research Report #1, write: Maryland Longitudinal Study, The University of Maryland, 2108 Mitchell Building, College Park, MD 20742.

2. A complete table of the correlations for the Representative and Black Groups is available from the above office.

3. A table of means of the six Holland types by CSSQ scale is available from the above office.

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